

I. Concerning the Amendments to the Claims

Claims 1, 2, 10, 11, 13, 16, and 33 have been amended to clarify various ranges recited in such claims by adding the word "about" to the respective, recited ranges. Bases for these amendments may be found in the specification, page 7, line 30; page 14, line 13; and page 16, line 8.

Claim 7 has been amended to provide the proper spelling of the word "starches". No new matter is believed or intended to be added to claim 7 by this amendment.

II. Rejections under 35 U.S.C. §112

Claim 7 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully **traversed** to the extent that it may apply to the presently presented claims.

Claim 7 was rejected for reciting the term "and copolymers thereof". Claim 7 has been amended to recite "copolymers comprising at least two of the preceding polymers". In view of this amendment, Applicants assert that Applicants' claim 7 is patentable under 35 U.S.C. §112, second paragraph.

III. Rejections under 35 U.S.C. § 102 and 35 U.S.C. § 103

By way of the Office Action mailed 01 May 1998, Examiner Reddick rejected claims 1, 2, 4-16 and 33 under 35 U.S.C. § 102(b) as allegedly being anticipated at the time the invention was made or, in the alternative, under 35 U.S.C. § 103 as obvious over and thus unpatentable in view of US Patent 5,264,471, to Chmelir (hereinafter referred to as "Chmelir") or US Patent 3,962,158, to Mima et al. (hereinafter referred to as "Mima").

These rejections are respectfully **traversed** to the extent that they may apply to the presently presented claims.

Chmelir discloses the use of polymers that are already highly water absorbent prior to the mixture of such polymers with a second component (see Chmelir, column 2 lines 35-40). Furthermore, the examples of Chmelir expressly disclose that the prepared polymers are

neutralized prior to the mixture with the second component (see Chmelir, column 7, lines 9-12; column 8, lines 2-3, and 64-67).

Mima discloses a hydrophilic polymer membrane comprised essentially of polyvinyl alcohol and chitosan. The membranes are manufactured by mixing an aqueous solution of polyvinyl alcohol with an aqueous solution of chitosan and then forming a film from the mixed aqueous solutions and then subjecting the film to an alkali treatment. See Mima, column 2, lines 18-24.

Applicants do not believe that Applicants' claims are anticipated by the cited references for the following reasons.

First, each of Chmelir and Mima disclose the use of aqueous solutions to prepare the compositions, respectively, of Chmelir and Mima. In Chmelir, see column 2, lines 45-50; column 5, lines 23-33; and Examples 1 and 2 (column 7, lines 9-15). In Mima, see column 2, lines 18-24 and 62-68; and Example 1 (column 4, lines 1-15). One skilled in the art would recognize that the use of such aqueous solutions would result in compositions that comprise molecular level dispersions of the materials used to prepare the respective compositions.

In contrast, Applicants' claims recite an absorbent composition comprising a mixture of an acidic water-swellaable, water-insoluble polymer and a basic material, wherein the mixture is not a molecular level dispersion of the acidic water-swellaable, water-insoluble polymer and the basic material.

Second, Applicants' claims recite an absorbent composition comprising an acidic water-swellaable, water-insoluble polymer, having a pK_a between about 2 and 12 and having at least about 50 molar percent of its acidic functional groups in free acid form. Such properties of the water-swellaable, water-insoluble polymer have been found by Applicants to be necessary in order to achieve the desired absorption properties of both high absorption capacity as well as a relatively slow absorption rate (see Applicants' specification, page 10, line 26 to page 11, line 24; and the Examples). Such limitations are neither disclosed nor suggested by the cited references.

In the Office Action mailed 01 May 1998, Examiner Reddick stated that the polymer exemplified in Chmelir is neutralized to the extent of about 45 percent. Applicants believe this to be an incorrect reading of Chmelir. Both Examples 1 and 2 of Chmelir disclose that an acrylic acid polymer is neutralized with potash lye. However, Applicants' contend that one skilled in the art would interpret the use of the 45 percent value in Examples 1 and 2 of Chmelir to refer to the concentration of the potash (in a lye solution) being used to neutralize the polymer instead of as the neutralization of the polymer achieved. Furthermore, one skilled in the art would recognize

that, based on the amount of potash lye being used in relation to the acrylic acid that was used to prepare the polymer in the respective examples, the neutralization of the acidic groups of the polymer would be very high (on the order of about 90 percent or greater). Such a high neutralization of the polymers prepared in the respective examples is also demonstrated by the absorbent properties exhibited by such polymers, as reflected by the tea bag test values that are reported, for example, in Tables 1 and 2 in Chmelir. One skilled in the art would recognize that only a highly neutralized polymer would be capable of exhibiting such highly absorbent properties. In contrast, a polymer that was substantially unneutralized would exhibit relatively low absorbent values. (See Applicants' specification, page 10, line 33, to page 11, line 9.) As such, Chmelir does not disclose an absorbent composition comprising a water-swellaable, water-insoluble polymer having at least about 50 molar percent of its acidic functional groups in free acid form. *Linda*

Mima discloses a hydrophilic polymer membrane comprised essentially of polyvinyl alcohol and chitosan. One skilled in the art would recognize that neither polyvinyl alcohol nor chitosan are acidic materials. As such, Mima does not disclose an absorbent composition comprising an acidic water-swellaable, water-insoluble polymer. The purpose for treating a film formed according to Mima with an alkali treatment is to convert a (water-soluble) chitosan acid salt to a water-insoluble, acid free chitosan (see Mima, column 3, lines 24-27).

As such, the cited references do not identically describe each and every element of Applicants' claimed invention and the cited references do not inevitably produce Applicants' claimed invention. Thus, Applicants' claims are not anticipated under 35 U.S.C. §102(b) in view of the cited references.

Applicants also do not believe that Applicants' claims are obvious in view of the cited references for the following reasons.

First, all of Applicants' claim limitations must be considered, especially when missing from the cited references. As indicated above, Applicants' claims recite that the acidic water-swellaable, water-insoluble polymer comprises acidic functional groups and has at least about 50 molar percent of the acidic functional groups in free acid form. Such properties of the acidic water-swellaable, water-insoluble polymer have been found by Applicants to be necessary in order to achieve the desired absorption properties of both high absorption capacity as well as a relatively slow absorption rate. There is no disclosure or suggestion of such limitations in the cited references. While Chmelir discloses the use of polymers that are already highly water absorbent and/or neutralized, it is clear from the present specification that the Free Swell value and the Time

to Reach 60 Percent of Free Swell Capacity value recited in Applicants' claims will not result from the use of polymers that are already substantially neutralized and, thus, already highly water absorbent. Mima neither discloses the use of a polymer which is acidic nor which has at least about 50 molar percent of the acidic functional groups in free acid form. As such, the limitations that a water-swellaible, water-insoluble carboxyalkyl polymer: 1) exhibits a pK_a between about 2 and 12 and, 2) comprises acidic functional groups and has at least about 50 molar percent of the acidic functional groups in free acid form and exhibits desired Free Swell and the Time to Reach 60 Percent of Free Swell Capacity values are missing from the cited references.

Furthermore, Applicants' claims recite an absorbent composition comprising a mixture of an acidic water-swellaible, water-insoluble polymer and a basic material, wherein the mixture is not a molecular level dispersion of the acidic water-swellaible, water-insoluble polymer and the basic material. In contrast, each of Chmelir and Mima disclose the use of aqueous solutions to prepare the compositions, respectively, of Chmelir and Mima. One skilled in the art would recognize that the use of such aqueous solutions would result in compositions that comprise molecular level dispersions of the materials used to prepare the respective compositions.

Thus, when claimed limitations are absent from cited references, the claimed limitations cannot be prima facie obvious in view of such references.

Second, the discovery of the source of a problem may result in a patentable invention even if the solution would have been obvious once the source of the problem was discovered. In the present application, Applicants have discovered that substantially neutralized polymers, such as most commercially available superabsorbent materials, generally exhibit relatively fast liquid absorbing properties (see Applicants' specification, page 2, lines 21-35; and the Examples).

To solve this problem, Applicants have discovered that when an acidic water-swellaible, water-insoluble polymer, substantially in its free acid form is mixed with a basic second material such that a molecular level dispersion of the acidic water-swellaible, water-insoluble polymer and the basic material is not formed, the resulting absorbent composition will exhibit both a relatively high capacity for liquid absorption as well as a relatively slow liquid absorbing rate. This is due, it is believed, to be because as the mixture is placed in an aqueous solution, the acidic water-swellaible, water-insoluble polymer, substantially in its free acid form, reacts with the basic second material and the chemical equilibrium is in favor of converting the acidic water-swellaible, water-insoluble polymer from its free acid form to its respective salt form. As such, the mixture comprising the converted water-swellaible, water-insoluble polymer will now exhibit a relatively high

capacity for liquid absorption. However, because the conversion of the water-swellaable, water-insoluble polymer, from its free acid form to its respective salt form is a relatively slow process of ionization and ion diffusion into the polymer, the water-swellaable, water-insoluble polymer will also exhibit a relatively slow liquid absorbing rate. (See Applicants' specification, page 10, line 26 to page 11, line 24.) Furthermore, Applicants have demonstrated this improvement in absorbent properties for a variety of acidic water-swellaable, water-insoluble polymers (see Applicants' specification, the Examples). As such, Applicants believe that they have demonstrated the criticality of the limitations recited in Applicants' claims in order to achieve the absorbent properties of the polymer recited in Applicants' claims. In contrast, the cited references do not disclose or suggest the problems that occur when a polymer is neutralized and/or exhibits too fast of a liquid absorbing rate. As such, when cited references do not disclose a problem or its source, the solution to the problem will not be prima facie obvious in view of such cited references.

Third, the cited references teach away from Applicants' claims. Chmelir discloses the use of polymers that are already highly water absorbent and/or neutralized prior to the use of such polymers. Mima discloses the use of polymers that are not acidic. In contrast, Applicants' claims recite a water-swellaable, water-insoluble polymer that: 1) exhibits a pK_a between about 2 and 12 and, 2) comprises acidic functional groups and has at least about 50 molar percent of the acidic functional groups in free acid form which, as demonstrated in Applicants' Examples, will generally exhibit a relatively low liquid absorption capacity on their own.

Furthermore, each of Chmelir and Mima disclose the use of aqueous solutions to prepare the compositions, respectively, of Chmelir and Mima. One skilled in the art would recognize that the use of such aqueous solutions would result in compositions that comprise molecular level dispersions of the materials used to prepare the respective compositions. In contrast, Applicants' claims recite an absorbent composition comprising a mixture of an acidic water-swellaable, water-insoluble polymer and a basic material, wherein the mixture is not a molecular level dispersion of the acidic water-swellaable, water-insoluble polymer and the basic material.

As such, when cited references teach away from a claimed invention, such teaching away is a per se demonstration of a lack of prima facie obviousness in view of the cited references.

For the above reasons, Applicants contend that Applicants' Claims 1-2, 4-16 and 33 are patentable under 35 U.S.C. §102 and under 35 U.S.C. §103 in view of the cited references.

For the reasons stated above, it is respectfully submitted that all of the presently presented claims are in form for allowance.

Please charge any prosecutorial fees which are due to Kimberly-Clark Worldwide, Inc. deposit account number 11-0875.

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Respectfully submitted,

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CERTIFICATE OF MAILING

I, Audrey J. Akmentins, hereby certify that on September 1, 1998, this document is being deposited with the United States Postal Service as first-class mail, postage prepaid, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

By: Audrey J. Akmentins

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